

MIGRATION AND ROOSTING OF CHIMNEY SWIFTS IN EAST TEXAS

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THE Chimney Swift (*Chaetura pelagica*) is a common bird throughout Eastern United States and the subject of a number of excellent life history studies. Its nesting behavior and migration patterns are well-documented, especially for the northeast. Examples are reports from Connecticut (Saunders, 1959), New York (James, 1950; Fischer, 1958), Ohio (Dexter, 1960, 1969) and Pennsylvania (Groskin, 1945). To our knowledge its roosting in Texas has not been studied, so we undertook to determine: (1) the arrival and departure dates of Chimney Swifts in East Texas, and (2) their flocking behavior prior to and during entrance into the roost chimney.

Our study site consisted of two brick chimneys about $\frac{1}{2}$ mile apart, one on Aikman Gymnasium and the other on Raguet Elementary School, and the immediate area surrounding each on Stephen F. Austin State University campus, Nacogdoches, Texas. The chimneys' outer dimensions were 20 by 29 inches and both were approximately 30 feet high. We made direct observation at the Aikman chimney from March through October 1969 and at the Raguet chimney from June through October. We took roosting records 4-5 evenings per week, regardless of existing weather conditions. We tallied the numbers of swifts that entered the chimney with a hand counter and recorded the numbers entering during each 5-minute period. Light conditions were measured at ground level with a footcandle meter made by Welch Scientific Company, Skokie, Illinois.

Exact arrival dates of swifts in Nacogdoches are not known, but in 1969 they arrived during the first week of April as compared to the last week of March in 1968 and 1970. Based on these 3 years, 1 April appears to be the average arrival date in the Nacogdoches region.

On 8 April 1969, 27 swifts entered Aikman chimney and the next day approximately 400. This was believed to be the first large wave of migration into East Texas. After this wave the number of roosting birds remained nearly constant at about 100 until 17 and 18 April when 205 and 300 respectively entered Aikman chimney (Figure 1). The number dropped to approximately 100 again where it remained until 28 April when 324 swifts came in. The number decreased to a low of 31 on 15 May, followed by a small peak of 163 swifts on 17 May. This was the last migration wave before nesting began. The number then fluctuated between 28 and 83 with an average of 54 birds. Fol-

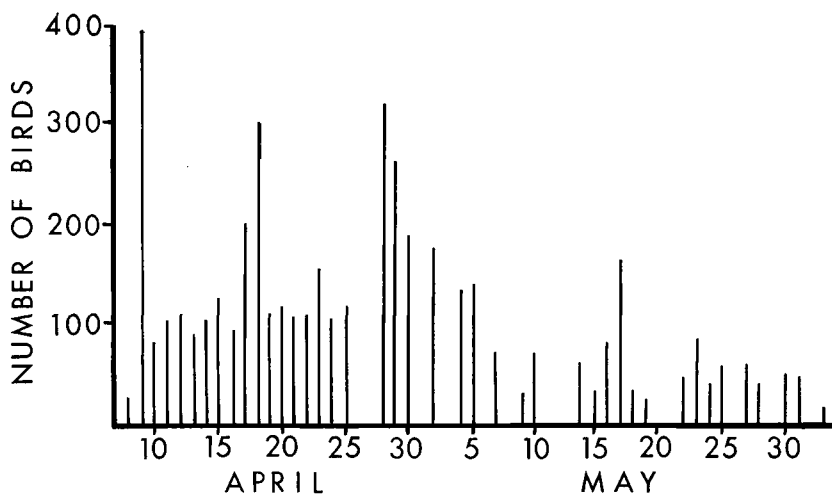


Figure 1. Number of Chimney Swifts roosting in chimney of Aikman Gymnasium, spring, 1969.

lowing a drop to 14 birds on 2 June, the number of roosting Chimney Swifts varied from two to five birds during the nesting period. During this time the Aikman chimney contained only one active nest. Those swifts that roosted in this chimney during April and May were migrating birds that either moved farther north in late May or scattered over the countryside to find suitable chimneys for nesting.

The arrival time of 1 April in East Texas agrees with that for other areas of the United States. Average arrival is 18 March in New Orleans (Fischer, 1958), the third week of April in Ohio (Dexter, 1961), between 17 and 24 April in New York (Fischer, 1958) and in Connecticut it is 28 April (Saunders, 1959).

Our findings are similar to those of Dexter (1950) who noted in Ohio that as many as 100 swifts roosted in a single air shaft in April and May but usually only a single pair (rarely a threesome or a foursome) nested in any one shaft with a single nest. Fischer (1958) found in New York that swifts did not arrive in waves but trickled in gradually, and the largest flock in his area was 12 birds. Also, in his area the swifts that roosted at a site were nearly always nesting residents. Fischer thus concluded that his study area was not on a major migration route. We consider Nacogdoches to be on one of their major flight routes.

Other authors (Pickens, 1935; Groskin, 1945) have described flocking behavior prior to entering the chimney at night in detail and it need not be discussed here, but a few other aspects of behavior prior to

and during entrance into the chimney are significant enough to warrant discussion. Chimney Swifts followed an inconsistent pattern as they circled the chimney for varying lengths of time prior to entering. The circling pattern changed from clockwise to counterclockwise several times before the swifts dropped into the chimney. On some days birds entered the chimney directly without circling, whereas on others birds circled for 25 to 30 minutes before any entered. Average time required from circling to beginning of descent was 2.9 minutes for 28 different days from 14 April to 28 May.

Total time required for all birds to enter the chimney also varied from day-to-day. Because of the usual late arrival of a few individual stragglers, we measured the time required for 80 percent of the birds to enter. For April and May this time varied from 5 to 20 minutes as follows: 5 minutes, 10 days; 10 minutes, 14 days; 15 minutes, 16 days; and 20 minutes, 1 day.

Time needed for swifts to enter the chimney varied with weather conditions and total number of birds roosting. On those days with high numbers of birds roosting (9, 18, 28 April and 17 May) at least 80 percent entered the chimney in less than 5 minutes. During those days with fewest birds in attendance, 80 percent of the birds generally required from 10 to 15 minutes. On certain days before and after high peak numbers entered (8, 10, 17 April and 16 May) time needed for 80 percent to enter was also within 5 minutes. The average times needed for 80 percent of the birds to enter the chimney between the four migratory peaks were 10.6, 11.4, 11.8, and 13.0 minutes.

Reasons for not flocking and roosting in the same manner every day are not really understood. The day's weather conditions or the time of return to the chimney may be partly responsible. If weather is not favorable during the day, swifts may feed later than usual and thus enter the chimney steadily just before it becomes too dark. Weather conditions seemed to accelerate entrance times on some days. For example, 80 percent entered in less than 5 minutes on 17 and 23 April, when wind velocity was above 10 mph, on 14 May when there was lightning and thunder, and on 16 May when there were showers, all immediately before or during entrance times.

Time of roosting could be predicted fairly accurately because entrance into the roosting chimney is closely related to time of sunset (Figure 2), or more directly, light intensity. Although entrance time was closely correlated with intensity, swifts did not enter at the same light intensity each month. In April, average light intensity (footcandles) at peak of entrance time into the chimney was 4.9; in May, 5.5; June, 14.2; July, 7.0; August, 4.2; September, 2.0; and October, 3.8. As might

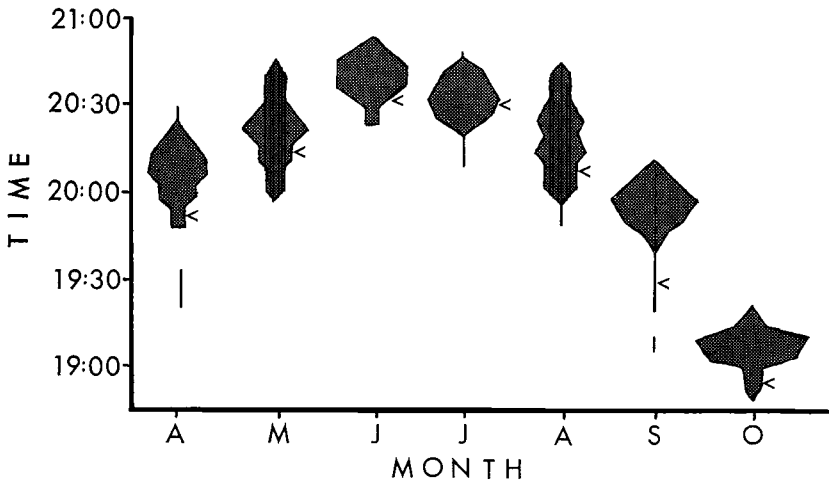


Figure 2. Monthly variation in entrance times. Width of figure represents percentage of total number of birds entering at indicated time. < indicates average time of sunset (Daylight Savings Time).

be expected there was a negative correlation between light intensity and time after sunset when swifts roosted. Findings for this aspect were as follows: in April 80 percent had entered by 14.3 minutes after sunset; in May they required 16.4 minutes; in June, 11.0 minutes; July, 11.6 minutes; August, 15.9 minutes; September, 16.0 minutes; and October, 17.8 minutes. Earlier entrance times in June and July were possibly correlated with reproductive activity. One nest, which produced four young, was present in Aikman chimney but the structural design of Raguet chimney prevented examining it for nests.

Aikman chimney served as both a nesting site during summer and a roosting site for migrating swifts in fall (Figure 3). Swifts in Aikman chimney increased from 5 in July to 60 in August, whereas those in Raguet chimney increased from 10 to over 700. Roosting populations fluctuated widely in August just as they did during the spring migration. For example, in Raguet chimney 500 birds roosted on 5 August, 360 on 11 August, 570 on 17 August, 360 on 20 August, 790 on 26 August, 220 on 27 August, and 490 on 28 August. The August increase of roosting birds at the end of the nesting period was followed in September by a period when no swifts roosted in Aikman chimney and only 60 in Raguet chimney. Fall migrants used Aikman chimney again in October, but none entered Raguet chimney. Numbers during this fall migration fluctuated from a minimum of 6 birds to a maximum of 220. On 10 October 31 swifts roosted in Aikman chimney, on 12 October

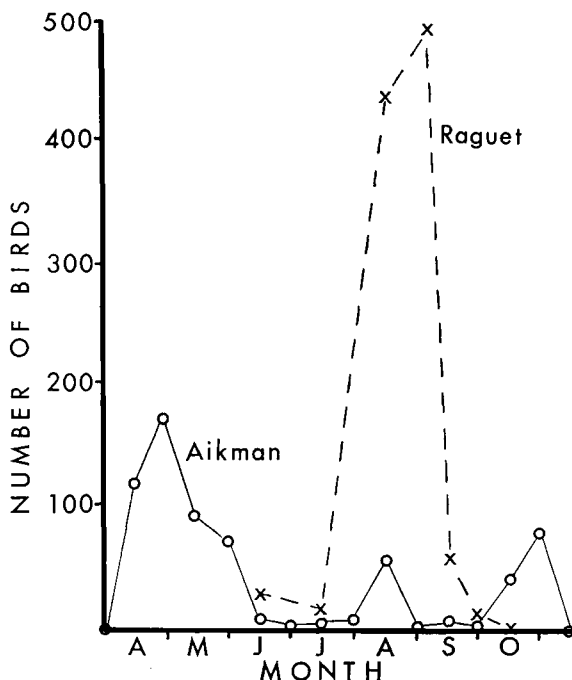


Figure 3. Average number of roosting Chimney Swifts per night in two chimneys, by 15-day intervals.

176, on 16 October 18, on 20 October 220 and on 22 October, the last day birds were seen in Nacogdoches, only 5 birds were present.

The population fluctuations in August are somewhat difficult to explain. This increase of birds may have represented an early wave of migrants from the north (which seems unlikely) or a massing and wandering of local birds prior to a mass departure for more southerly regions. August populations were probably composed of adults and their young that had nested in other chimneys in the Nacogdoches area and represented the postbreeding flocking. After young could fly these families joined together in premigratory flocks that wandered from area to area and not necessarily southward. They possibly used one chimney for several days, then roosted in others prior to migrating. Fischer (1958) described the joining of families at sites other than where they nested and termed it postnesting wandering.

The increase of birds in October probably reflected the arrival of migrants from the north. However, these northern migrants used only Aikman chimney and not Raguet (Figure 3). We are unable to explain

why so many birds used Raguet chimney in July, August, and early September, but none used it as an autumn roosting site.

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